

COMPONENTS

FAQ

Q Can I install two HD 3870 X2 graphics cards in the same motherboard?

A In theory, yes. Motherboards that support CrossFire X will allow you to do this, but AMD hasn't yet released a driver that enables two 3870 X2 cards to work together. Without the driver, only one card will be recognised and the other will remain idle. AMD plans to have a working driver ready in the next few weeks.

As well as the driver, you'll need at least a 750W power supply and four six-pin PCI-E power connectors. You'll also need a large case, as each card takes up two slots and needs at least 280mm clearance to avoid fouling any hard disks mounted at the front of the case.

Jim Martin

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AMD Phenom 9600

★★★★

£150 inc VAT

From www.tekheads.co.uk

AMD's first quad-core processor has been a long time in the making, but the Phenom is finally here. AMD is keen to stress that this is the first 'true' quad-core design; Intel's Core 2 Quad is essentially two dual-core processors in one package. The disadvantage of Intel's approach is that there's no shared cache between all four cores – each pair has individual cache memory.

AMD has added a 2MB Level 3 cache to the Phenom to eliminate this problem. According to the company, this boosts performance because it allows the delivery of a large amount of data to one core, or smaller amounts of data to all four simultaneously.

You can also buy a triple-core Phenom, called the X3, which is a cheaper alternative. It's basically a quad-core Phenom with one failed core. We'll review this in next month's *Labs* test of processors.

Despite shouting about the Phenom's 'true' quad-core design, AMD admits that none of the current models in its Phenom range (including the 9600 on test here) is a high-end processor that can compete with Intel's top-end Core 2 Quads. Instead, AMD aims to undercut Intel's prices and make quad-core processors available to everyone.

The 9600's four cores run at 2.3GHz, and each has 512KB of L2 cache to play with. The new L3 cache is available to any or all of the cores. Although the chip will work in AM2 motherboards, you'll need an AM2+ board such as MSI's K9A2 (opposite) to get the most out of the Phenom. This is because AM2+ motherboards support the Phenom's superior power management and HyperTransport 3, the link between the processor and the other components on the motherboard. This runs at 2.6GHz, whereas older AM2 motherboards with HyperTransport 2 have a slower



1.4GHz link. The Phenom's integrated memory controller supports DDR2 RAM up to 1,066MHz.

Sadly, the 9600's performance in our benchmarks was mildly disappointing. It managed only 103 in our audio-encoding test, a score most dual-core laptops beat. Its strength lay in video encoding, where it proved to be one of the fastest processors we've seen. Its score of 364 pales in comparison with that of Intel's similarly priced Core 2 Quad Q6600, though, which scored 453 in this test. It also managed 227 in our multitasking test – far ahead of the Phenom's 175.

Other Intel processors will cause problems for Phenom, too. For around £120 you can buy a Core 2 Duo E6750, which is noticeably quicker overall in our benchmarks. You might expect four cores to be more efficient at multitasking than two, but the E6750 scored a whopping 234 in our multitasking test.

AMD will launch two new Phenoms over the next few weeks, the 9700 at 2.4GHz and the 9900 at 2.6GHz, but Intel isn't resting on its laurels either.

New Core 2 Quads, based on a more efficient 45nm process, will be available at around the same time, and we expect the Q9300 (which runs at 2.5GHz) to cost around £160-£170 and be much quicker than the Phenom 9600. Unless AMD drops its prices and the performance of the faster models is noticeably better than that of the 9600, Intel's processors will still be better value.

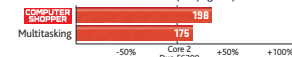
Jim Martin

SUMMARY

- ✓ Fast video encoding
- ✓ Cheaper than most Intel Core 2 Quads
- ✗ Slower than Core 2 for some tasks

PROCESSOR Four cores running at 2.3GHz, Socket AM2+, 4x 512KB L2 cache, 2MB L3 cache.
PART CODE HD9600WCGDBOX
DETAILS www.amd.com

PERFORMANCE (see page 58)



Also consider...

INTEL Core 2 Duo E6750

★★★★★

£117 inc VAT

From www.redstore.com



BEST BUY Intel's latest Core 2 Duo processor has a faster FSB speed of 1,333MHz, so there's more bandwidth available to talk to system components, although you need a motherboard that supports this speed. It's incredibly quick, but also great value.

If you're looking to build a new PC and want a lightning-fast processor, this is the one to buy.



PROCESSOR Two cores running at 2.66GHz, LGA775, 333MHz external bus (1,333MHz quad-pumped FSB), 4MB L2 cache
PART CODE BX80557E6750
DETAILS www.intel.com
FULL REVIEW Oct 2007



GIGABYTE GeForce 8800GT

★★★★★

£151 inc VAT

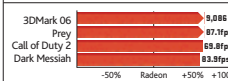
From www.dabs.com



BEST BUY Despite only taking up one slot inside your PC, the GeForce 8800GT is a powerhouse that will play the latest games with no problems, even if you want to play with the highest quality settings. It can also decode HD video, including Blu-ray and HD DVDs, so it's ideal for a Media Center system that will also be used for gaming.



PCI EXPRESS GRAPHICS CARD Nvidia GeForce 8800GT, PCI-E x16 interface, 512MB GDDR 3 memory running at 900MHz (1.8GHz effective), 600MHz core speed, 2x DVI, TV out
PART CODE GV-NX88T512H-B
DETAILS www.giga-byte.co.uk
FULL REVIEW Mar 2008





MSI K9A2 CF

★★★★★

£59 inc VAT
From www.dabs.com

MSI's new K9A2 CF is a low-cost motherboard based around AMD's new 790X chipset. Its main feature is the AM2+ processor socket, which supports AMD's new Phenom quad-core processors. The Phenom has better power management than older Athlons, but this works only when installed in an AM2+ socket.

The K9A2's dual graphics card slots support the faster PCI-E 2.0 standard, so although both will operate at x8 if you install two graphics cards, the faster speed gives each card the 8GB/s bandwidth of a x16 PCI-E 1.1 slot. The 790X chipset also supports the HyperTransport 3 link between the processor and the Southbridge and runs at 2.6GHz, which is faster than the 1.4GHz HyperTransport 2 of AM2 boards.

The K9A2 CF is a cut-down version of the Platinum Edition and lacks FireWire, eSATA and a TPM encryption module. It has a modest range of connectors, including a legacy serial port. The four SATA ports support RAID 0, 1 or 0+1, so storage is well catered for. It has 8-channel audio built in, but no S/PDIF output.

This corner-cutting has reduced the price and also the width of the board. It doesn't have a third column of mounting holes, and overhangs the second column by 50mm. This may sound trivial, but the circuit board flexes alarmingly when you plug in the ATX power connector and apply pressure to install RAM.

A highlight of the K9A2 is the Cell menu in the BIOS. This lets you overclock the FSB, HyperTransport, PCI-E and memory, and increase the voltages. The voltage options were greyed out in our test BIOS so we couldn't test to see how overclockable the board is.

The K9A2 isn't a bad choice of motherboard for an AMD processor, but until MSI provides a finished BIOS and we see better performance from AMD's Phenom processors we can't recommend it as the basis for a new PC.

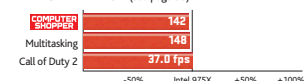
Jim Martin

SUMMARY

- ✓ PCI Express 2.0 slots
- ✓ Good value
- ✗ Overclocking needs work

AMD MOTHERBOARD AM2+, AMD 790X/
AMD SB600 chipset, 4x DDR2 533/667/800
slots, 2x PCI-E x16, 1x PCI-E x1, 2x PCI, 4x
SATA/300 ports, 4x USB2
PART CODE MS-7388
DETAILS www.msicomputer.co.uk

PERFORMANCE (see page 58)



SAPPHIRE Radeon HD 3870 X2

★★★★★

£257 inc VAT
From [www.lambda-tek.com/
componentshop](http://www.lambda-tek.com/componentshop)

Last month we reviewed Sapphire's HD 3870 (*What's New, Shopper 242*), which is a fine mid-range graphics card. If you have a CrossFire motherboard, you could buy two of these cards for much better performance.

However, CrossFire is tricky to set up and not all games support it. An alternative is the new 3870 X2, which has two HD 3870 graphics processors. Each has 512MB of GDDR3 RAM and runs at 825MHz, 50MHz faster than the HD 3870. Oddly, the memory runs at 1.8GHz, which is slower than the original card's 2.25GHz.

Using beta drivers, we saw impressive performance. Both *Prey* and *Dark Messiah* ran at over 100fps. 3DMark06 was no match for the X2 either, as it scored 12,635, the highest result we've seen. With the DirectX 10 title *Crysis*, average frame rates were more meagre at 25fps with high quality settings and no anti-aliasing or anisotropic filtering. Frame rates plummeted when there was a lot of action, so we had to reduce to medium quality for smooth gameplay. We hope to see better performance with finished drivers.

The real problem with this card is space. The two-slot design is 270mm long and weighs 1kg. It needs two six-pin PCI-E power connectors, one of which must be an eight-pin connector if you want to enable overclocking settings in the Catalyst Control Center. The fan wasn't noisy, but the card became hot to touch.

At almost £260, the HD 3870 X2 isn't much cheaper than buying two HD 3870s. However, it's still considerably cheaper than a GeForce 8800 Ultra, which is roughly as fast.

We can't recommend the 3870 X2 unconditionally, as Nvidia is about to launch new cards. We'd wait for the benchmark results.

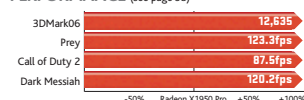
Jim Martin

SUMMARY

- ✓ Superb performance
- ✓ Simple to install
- ✗ Expensive, huge

PCI EXPRESS GRAPHICS CARD 2x ATI
Radeon HD 3870 chipset, 825MHz core
speed, 1GB DDR3 memory running at
1.80GHz, PCI Express x16 interface
PART CODE 21122-05-40R
DETAILS www.sapphiretech.com

PERFORMANCE (see page 58)



ASUS EN8800GS TOP

★★★★★

£125 inc VAT
From www.aria.co.uk

Asus's latest graphics card, the EN8800GS TOP, is based on the GeForce 8800GS, essentially a cut-down 8800GT (see 'Also consider...' opposite). It has 96 stream processors instead of 112, 384MB of RAM rather than 512MB and a 192-bit memory interface instead of 256-bit.

Asus has overclocked the card from the standard 8800GS speeds of 550MHz, 1,375MHz and 1,600MHz for the core, shader and memory respectively. Despite the extra speed, the scores below aren't nearly as good as the 8800GT's, but there's still plenty of scope for overclocking with the SmartDoctor utility.

The huge 80mm fan and heatsink provide plenty of cooling power to ensure the card doesn't overheat when overclocking. We were able to push the core speed to 750MHz, the memory to 1,950MHz and the shader clock from 1,700MHz to 1,825MHz.

These significant increases led to around 15 per cent higher frame rates in our game tests. *Call of Duty 2* rose from 59fps to 68.3fps. This is great performance for the money, but Sapphire's Radeon HD 3870 costs only a few pounds more and is considerably faster still (although not in *Call of Duty 2*).

The EN8800GS TOP has HDCP support and can decode high-definition video, just like the 8800GT and HD 3870. The fan is relatively quiet, too. The component video adaptor in the box is useful if your display doesn't have DVI.

At this price, the EN8800GS TOP doesn't perform well enough to beat the Radeon HD 3870 for value, and is undermined by the fact that Asus sells the same card, the EN8800GS, without overclocking for just £105. This has the same cooler, so you may be able to overclock it yourself to get the same performance. If your budget is tight, the £105 EN8800GS is a great choice and much faster than Sapphire's Radeon HD 3850 (see *What's New, Shopper 241*).

Jim Martin

SUMMARY

- ✓ Very overclockable
- ✓ Quiet
- ✗ Not fast enough for the price

PCI EXPRESS GRAPHICS CARD Nvidia
GeForce 8800GS chipset, 600MHz core
speed, 384MB DDR3 memory running at
1.8GHz, PCI Express x16 2.0 interface
PART CODE 90-C1CKB0-QOUAY00Z
DETAILS <http://uk.asus.com>

PERFORMANCE (see page 58)

